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ABSTRACT

A study explored the use of an interactive analysis system, the Reciprocal Category System (RCS), for recording and analyzing observations of individuals tutoring in reading. The supervision of teaching requires observation, and the RCS can provide detailed, objective, and quantifiable records of behavior categories that occur in teacher-learner interactions and indicate whether the behaviors subsequently diminish or increase. Three observers first viewed videotapes of tutoring sessions. The data were then used to determine intraobserver and interobserver reliability. Five aspects of instruction were selected to see if they could be predicted from interaction patterns. It was found that the RCS categories are not sufficiently specific, in that types of questions are not identified, and correct and incorrect responses are not discriminated. Due to the small number of comparisons, the usefulness of certain indices is tentative. Refinements in RCS categories are called for before further research is undertaken. (CRH)

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Interactive Analysis of Reading Instruction with the Reciprocal Category System

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The authors explored the use of the Reciprocal Category System (RCS) for recording and analyzing observations of individual tutoring in reading. This was planned as a preliminary study to be followed by the application of RCS to group instruction of reading and other subjects.

Supervision of teaching requires the observation of teaching. Often, observational records are global, anecdotal, or verbatim. Interaction analysis systems, of which RCS is one, provide detailed, objective, and quantifiable records of selected categories of behavior that occur in teacher-learner interactions (1,3,4). These features of interaction analysis make the procedure suitable for research. Interaction analysis can trace selected variables through a teaching session with greater exactness than global or anecdotal methods.

For the same reason, quantifiable systems like interaction analysis should have potential value for supervision of teaching. They permit the supervisor to establish objectively and quantifiably the degree that a particular behavior is present and whether that behavior increases or diminishes in subsequent observations. Without such quantification, the supervisor and teacher often rely on subjective "feelings" about the behavior in question.

The Reciprocal Category System (RCS), has several distinctive characteristics that appear to make it superior to some other interaction analysis systems: (1) the same categories are applied both to the student and the teacher, (2) several of the categories appear to be significant for cognitive learning (e.g. a distinction is made between convergent and divergent thinking in responses to questions), (3) more than one type of behavior may be reported during a standard recording interval, (4) changes of verbal category

by one student may be distinguished from a change that results when a second student verbalizes.

Interaction analysis systems have a limitation as a supervisory procedure that is a direct consequence of the necessary use of predetermined categories. A significant attribute of a teaching session could go unrecognized if it does not fit into a category of the interaction analysis system although that attribute might be recognized by a supervisor using a global approach. The attribute could be investigated with an interaction analysis system that uses appropriate categories. For example, to quantify observations of questioning patterns of teachers Guszak assigned questions to six categories, identified four categories of actions (by pupil or teacher) to follow questions, and identified four ways to cluster questions (2).

Methodology

Reading tutorial sessions (one tutor and one pupil) were videotaped and the tapes were viewed by the authors. After preliminary experience with RCS the three observers viewed one set of tapes twice each while using RCS to generate "original" matrices of data. RCS matrices (see appendix) were generated from these original matrices and intra- and inter-observer reliability coefficients were generated for each tape using the Scott coefficient (5). This coefficient served to gauge the observers' mastery of the system as well as the reliability of the RCS. Reliability coefficients are shown in Tables 1 and 2. It is clear that reliability is sufficiently high.

This phase of the research led to some refinements in coding without fundamentally changing the RCS. This was accomplished by identifying subcategories within each of several RCS categories. Another outcome was the identification of several aspects of reading instruction which possibly could be predicted from certain interaction patterns. These aspects are:

(1) level of student involvement in the lesson; (2) material appropriate to student's reading level; (3) opportunities for independent thinking by the student; (4) clarity of teacher's questions and directions; (5) teacher encouragement of the pupil .

The next phase of research was to view another series of tapes and extract from the RCS matrices indices for each of the five identified aspects of instruction. Other observers viewed these tapes without using RCS and were asked to rate the tapes according to each of the five aspects of instruction. This step was applied to a set of six tapes, but analysis was restricted because of numerous ties and inter-observer inconsistencies in the ratings.

A second set of six tapes was rank ordered by two new observers. The rankings were far more consistent. These observers ranked one tape highest on all five instructional aspects and one lowest. These two tapes were viewed by two observers using the RCS codings.

Results

The RCS categories are listed in the following figure:

Figure 1: Reciprocal Category System

Category number assigned		Description of verbal behavior
to teacher talk	to student talk	
1	11	"Warms" (informalizes) the climate
2	12	Accepts
3	13	Amplifies another's contribution; requests for amplification
4	14	Elicits
5	15	Responds
6	16	Initiates
7	17	Directs

Figure 1: Reciprocal Category System (continued)

Category number assigned		Description of verbal behavior
to teacher talk	to student talk	
8	18	Corrects
9	19	"Cools" (formalizes) the climate
10	10	Silence or confusion

It was hypothesized that the following indices would predict the instructional aspects.

1. Student involvement in lesson:

   directly related to:

   proportion of 13's, 15's, 16's; lower right quadrant

   of RCS matrix compared to upper left quadrant;

   (11+...+19)/(1+...+9).

2. Material appropriate to reading level: inversely related

   to the proportion of 8's while reading; inversely related

   to 15-then-8.

3. Opportunities for independent thinking by pupil:

   directly related to 4-then-16; related to proportion

   of 16's.

4. Clarity of teachers questions and directions:

   inversely related to the ratio of 4's to 15's

   inversely related to 4-then-13's (requests)

   inversely related to 7-then-13's (requests)

   inversely related to proportion of 14's;

   inversely related to 4-then-4;

   inversely related to 4-then-10.

5. Teacher encouragement of the pupil:

related to proportion of 1's and 2's.

In nearly every case the use of the proposed index was unsupported when tapes rated differently in an instructional aspect were compared quantitatively on the RCS index. The only hypothesized indices that received at least partial support were proportion of 13's for student involvement in the lesson and the ratios of (4-then-4)/total and 4's/15's for clarity of teacher's questions and directions.

These judgments concerning the usefulness of certain indices, or their lack of usefulness, are tentative because they are based on a very small number of comparisons. However, certain refinements in RCS categories are evidently called for before further research is undertaken.

Discussion

Data interpretations of the RCS can be made by using category percentages, ratios, submatrices, behavior sequences, and cell loadings. Several of these types were used in the present study to determine whether five aspects of a tutorial session could be predicted using several proposed indices. In most cases the use of these indices was not supported. Several reasons for these negative results can be suggested.

The RCS categories are not sufficiently specific. Types of questions are not identified. (Guszak had used six types.) Correct and incorrect responses (5 or 15) are not discriminated. Category 3 and 13 are used to request amplification and sometimes to provide amplification. A series of 4's (questions) can refer to one question requiring considerable time, restatements of one question, or a series of different questions. With refinements of the categories and expansion of subtypes, RCS may become more satisfactory and a valid predictor of significant aspects of teaching. Also,

category percentages are influenced by the frequencies of other categories, in particular, the frequency of 10's. Time spent in reading and writing was arbitrarily coded as 10's. The computation of category percentages after first removing the tally of 10's may be preferred.

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Table 1. Intra-observer reliability coefficients (Scott's coefficient) for three observers.

TAPE	OBSERVER		
	1	2	3
1	.420	.460	.642
2	.477	.599	.805
3	.684	.834	.882
4	.749	.637	.758
5	.594	.690	.792
6	.720	.784	.709
7	.816	.865	.835

Tabel 2. Mean inter-observer reliability coefficients (Scott's coefficient) for three observers.

TAPE	VIEWING	MEAN SCOTT COEF.
1	1	.695
	2	.760
2	1	.547
	2	.807
3	1	.678
	2	.747
4	1	.662
	2	.766
5	1	.584
	2	.612
6	1	.750
	2	.739
7	1	.820
	2	.752
8		.713
9		.803
10		.648
11		.772
12		.665
13		.741
14		.772

APPENDIX

RCS MATRIX FORM

	1	2	3	4	5	6	7	8	9	11	12	13	14	15	16	17	18	19	10	T
1																				
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INTERACTIVE ANALYSIS OF READING INSTRUCTION WITH THE RECIPROCAL CATEGORY SYSTEM

ABSTRACT

This paper reports a preliminary study of an interactive analysis system, the Reciprocal Category System (RCS), applied to observations of individual tutoring in reading.

Three observers first viewed videotapes of tutoring sessions to determine intra- and inter-observer reliability using the Scott coefficient. Reliability coefficients were sufficiently high. Five aspects of instruction were selected to see if they could be predicted from interaction patterns. Two tapes in a set of six were ranked highest and lowest in these five aspects. RCS indices of interaction patterns were examined for predicting the five instructional aspects.

One index was found to distinguish the two tapes for student involvement in the lesson. Two indices predicted clarity of teacher's questions and directions. No other indices predicted any of the five aspects of instruction. Suggestions were made for refining the RCS categories with the possibility of improving their value for research and supervision.